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A Treatise on Roller Mill Belt Guards

Showing How to Guard Against the Hazards of Exposed Belts. Guards of Standard Construction and Design— Simple, Economical and Fireproof

Millers Mutual Casualty Insurance Co.
Insurance Exchange
Chicago

Safeguard Standards

1. The guard must be praetieal and designed to protect an aetual hazard.

2. The guard must not conceal the parts protected, and must not interfere with the operation of the machinc.

3. Thc guard must be of substantial construction and made entirely of fireproof materials when possible.

4. The guard should be of the removable type. The "Quick-Dctachable" method is reeommended as it affords instant access to the machine and is as readily replaced.

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Roller Mill Guards

THE Milling and Grain Industry, like every great industry, should collect and analyze the cause and frequency of accidents peculiar to their class of business. The designing of guards and safety devices to prevent similar occurrences, as well as the steps necessary for the elimination of hazardous conditions and unsafe practices, must be delegated to a central bureau to secure the benefit of collective experience.

The Millers Mutual Casualty Insurance Company realized at the outset that the Milling Industry was without this essential bureau and that as a result the unnecessary loss occasioned by accidental injuries was taking tremendous toll with practically no intelligent or concerted effort to eliminate this drain upon the resources of the entire industry. There being no available statistics upon which to base the relative hazard, which was absolutely essential for the promulgation of fair and equitable rates and credits, this company compiled this information by recording and classifying all accidents in this industry which came to our attention. These statistics are an invaluable aid in our Safety Campaign and form the basis of our safety bulletins and other safety propaganda.

SAFETY ENGINEERING DEPARTMENT

A Safety Engineering Department was organized and placed in charge of all accident prevention activities. Through the statistics compiled on the cause of accidents occurring in our class of business, their most frequent source as well as the most hazardous conditions in the mills are ascertained. Thus every member receives the benefit of the experience of other members. The value of this collective experience to the individual member cannot be estimated.

On the following pages is presented a set of guards for Roller Mill Belts. Approved guards for other various machines entering into the equipment of flour mills and grain elevators will be similarly treated in due course. Hazardous conditions and unsafe practices will be taken care of through the medium of safety bulletins.

SAFETY INSPECTION AND INDUSTRIAL BOARD

In view of the fact that the various State Industrial and Inspection Departments have been vested with wide discretionary powers as to what shall constitute a proper guard, many of our members having taken up this proposition unaided, have found that the guards they have installed do not meet with the approval of these various departments. As a result, the time and money expended for this purpose was an absolute loss, for in most instances the guards had to be greatly altered or entirely reconstructed. It was with a view of avoiding this loss of time and expense that we

have taken the matter up with the various State Departments and secured their approval on the guards shown on the following pages. Therefore, the installation of this guard will avoid the above mentioned difficulties. Our members can appreciate the assurance that the guard is of standard construction and design.

HAZARDS OF ROLLER MILL BELTS

The high speed of the belts and the low position of the pulleys on roller mills constitute one of the most hazardous conditions in the mill.

Unless properly guarded these belts are a serious menace to the safety of the employes whose duties require their presence in the vicinity of these hazards. The opportunity is ever present to catch some part of the clothing or person when working near or passing by them.

That roller mill belts are dangerous is amply proven by reference to the number of men that have been killed or injured by them. In every instance it has been clearly shown that these accidents could have been prevented had the belts been properly guarded. The fact that roller mill belts constitute one of the most serious hazards is the reason for the detailed treatment of the subject herein.

ROLLER MILL BELT GUARDS

The primary purpose of a guard is to prevent accidents, and in selecting a guard this must be the foremost consideration. Other features are desirable, but if lacking in the first essential the guard is valueless. There is also a psychological effect produced by guarding a machine which must not be lost sight of. The impression upon the employe that is created when guards are installed on the machine is always favorable, and assists in securing his support to the safety movement.

The guards shown on the following pages are the result of exhaustive experiments and careful research. They represent the most advanced ideas on proper guard construction, and will eliminate the waste and expense of experimenting with methods that have been proven undesirable and ineffectual.

ACCIDENT REDUCING VALUE

The accident reducing value of a guard is of greater import than the cost of installation, and is one of the most valued features to be found in the guards here presented.

Every contingency possible to anticipate has been provided for, and our experience shows that the installation of these guards will reduce roller mill belt accidents to a minimum, if not prevent them entirely.

FIREPROOF

These guards are constructed entirely of metal and are absolutely fireproof. Their installation does not affect the fire hazard and they are accepted by all Fire Insurance Companies. They have been approved by the Mutual Fire Prevention Bureau.

PERMANENT AND INDESTRUCTIBLE

In view of the fact that these guards are constructed entirely of metal, they are permanent and indestructible, so that once installed the work is done for all time. Their construction is simple and substantial, and cannot be injured by rough usage. They may be painted any color to harmonize with the color scheme or surroundings.

OPERATION OF MACHINES UNHINDERED

These guards will not interfere with the operation of the machines, for while they cover the belt, they do not enclose the working parts of the machine in such a manner as to interfere with its regular operation.

ACCESSIBILITY

By the use of our "Q-D" guard supports the guard may be lifted up from the floor and set aside for any repairs or adjustments. There are no screws to loosen nor tools of any kind required to remove the guard. It can be taken up and set aside instantly, so that it will not interfere with immediate access to the machine. This feature is one which we recommend on all guards. A guard which will render a machine difficult of access when access is necessary, and which will interfere with the employe at some time when his attention is required, ceases to operate as a guard and may become a source of danger. The guards presented herein act as guards at all times that they are required as such. They may be instantly set aside at such times as accessibility is required, and as quickly replaced to continue their function of guarding when this necessity is past.

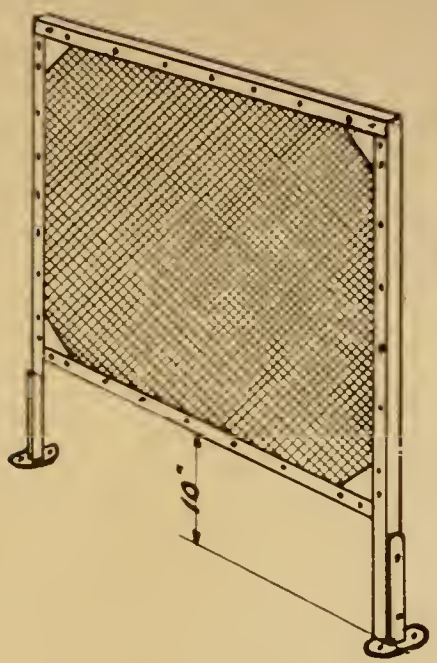
DESCRIPTION AND ILLUSTRATIONS

On the following pages are given detailed descriptions and illustrations which will enable the mill owner to supply us with all of the necessary data to properly equip his mill. It will require but little time to furnish all of the information necessary to install these guards and upon receipt of the required dimensions shown on pages 11, 13 and 14 we will be pleased to submit an estimate of the cost of these guards.

MILLERS MUTUAL CASUALTY INSURANCE CO.

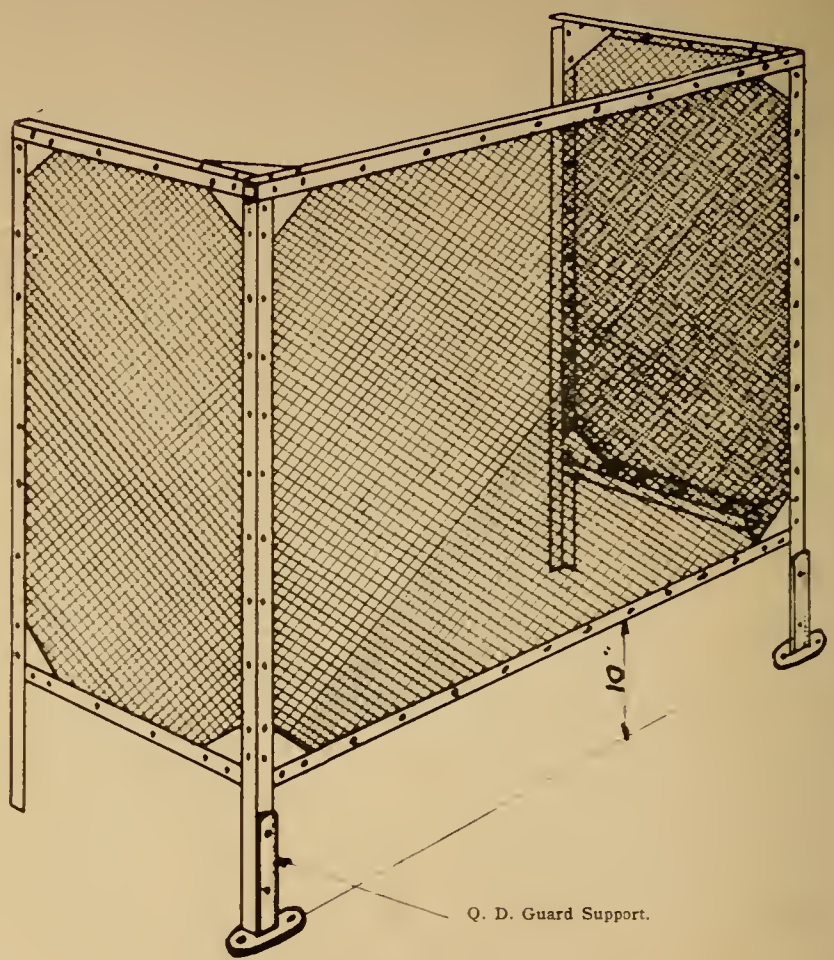
J. C. Addarly *Secretary.*

Front and End Guards



Front Guard

Located in Front of Belts on Adjoining Roller Mills as Shown on Page 10



End Guard

Located on Both Sides of Passageways and on Exposed Ends of Roller Mills as Shown on Pages 10 and 12

Materials and Construction

THE materials for these guards have been selected as the result of extended experiments and tests, and are recommended by us as offering the most practical and substantial guard construction.

ANGLE IRON

The frame of the guards consists of one inch angle iron bolted or riveted together. This material is furnished perforated on both sides and cut to size for each guard.

GUSSETS OR CORNER PLATES

Gussets or corner plates of sheet steel are used at the corner intersections for connecting the angle iron of the frame. They provide a very rigid method of construction and are furnished perforated and cut to size. Four of these plates are used on the front guards and sixteen on the end guards.

EXPANDED METAL

This material consists of a single piece of heavy sheet steel cut and expanded. It is considerably stronger than wire screen and costs about half as much. It will not unravel or weaken when cut, and also affords less resting place for dust to accumulate than wire screen, and it can be readily cleaned. In placing it on the guards the diagonal of mesh should be set vertical on the guard. This material is made in standard size sheets 24 and 28 inches wide and 8 feet long. It can be easily cut with a tinner's shears and can be bolted securely to the frame.

"QUICK DETACHABLE" GUARD SUPPORTS

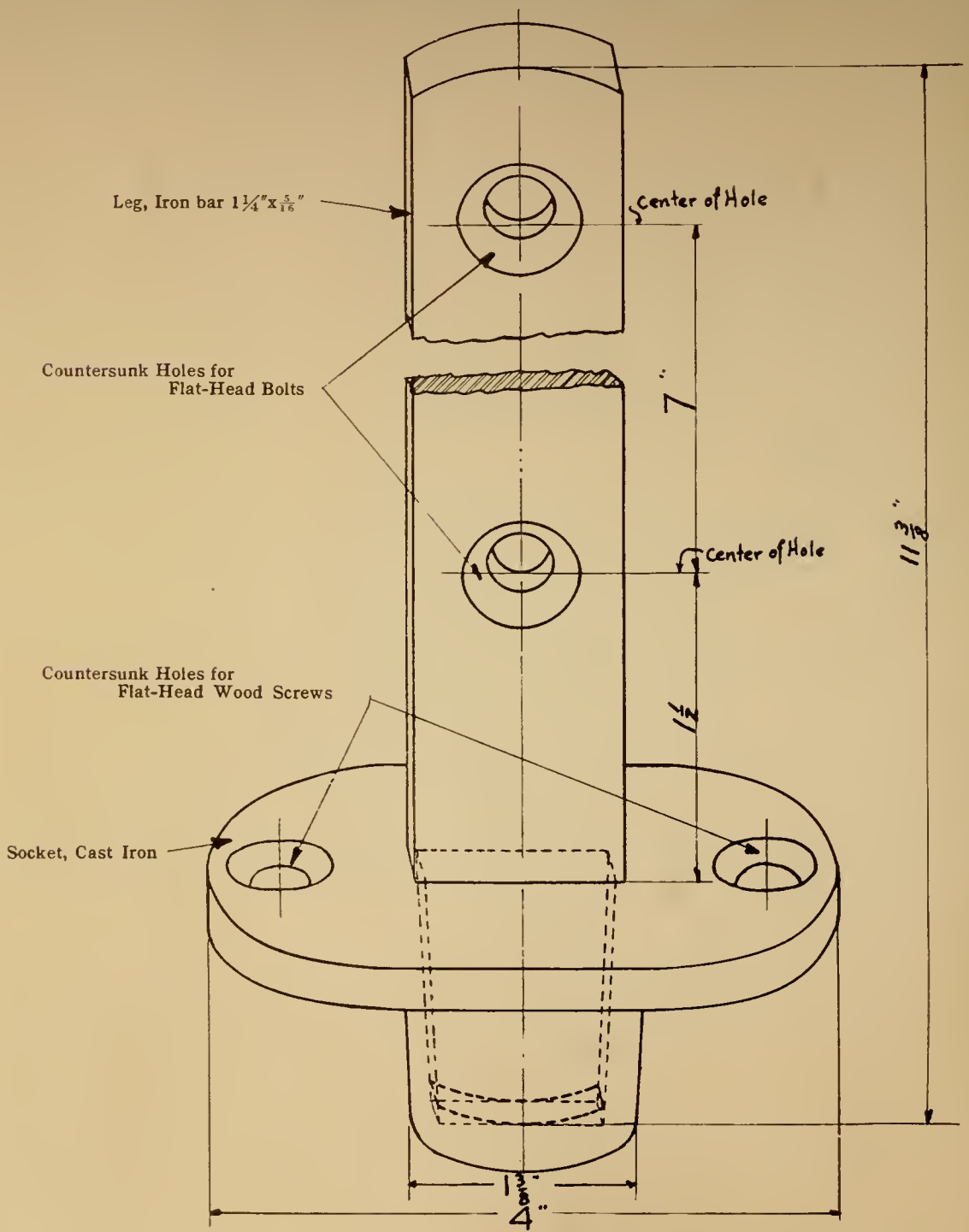
These "Q-D" supports are used to render the guard removable, and consist of a cast iron floor plate and a steel bar leg. The floor plate is set into the floor and the leg is bolted to the frame. These supports are the result of experiments with various means of attaching the guard to the floor, and will be found to overcome many difficulties encountered with many other methods.

SIMPLE AND SUBSTANTIAL CONSTRUCTION

No special skill or equipment is necessary to construct these guards. The angle iron and gussets are furnished cut to size and only need be bolted or riveted together to complete the frame. A screwdriver and hammer are the only tools necessary for this work.

After the frames are completed, the expanded metal mesh is cut to the proper size and bolted to the frame. In covering end guards with this material the ends should be cut separate instead of bending around from the front side. When this material is not wide enough two pieces can be fastened together by lapping about one inch and inserting bolts with washers on each side.

"Q-D" Guard Support



Quick Detachable Guard Supports

ON the opposite page is shown a cut of the "Q-D" Guard Supports to be attached to the legs of the guards shown on the following pages and which may be used in a similar manner with any other guard which is to be made removable.

The leg is a bar of cold drawn steel tapered at one end to fit the tapered hole in the floorplate. The holes in the legs are drilled and countersunk for attaching to the frame by means of bolts and forms a very rigid means for supporting the guards.

The floor plate is an iron casting with countersunk holes for wood screws and a tapered hole for receiving the tapered end of the leg. A 1½-inch hole is bored in the floor and plates set in leaving the base protrude slightly above the floor level, after which it is screwed or bolted to the floor. By this means the possibility of dirt or sweepings getting into the tapered hole and interfering with the setting of the guard is avoided. This floor plate is only for use when setting the guards on wooden floors.

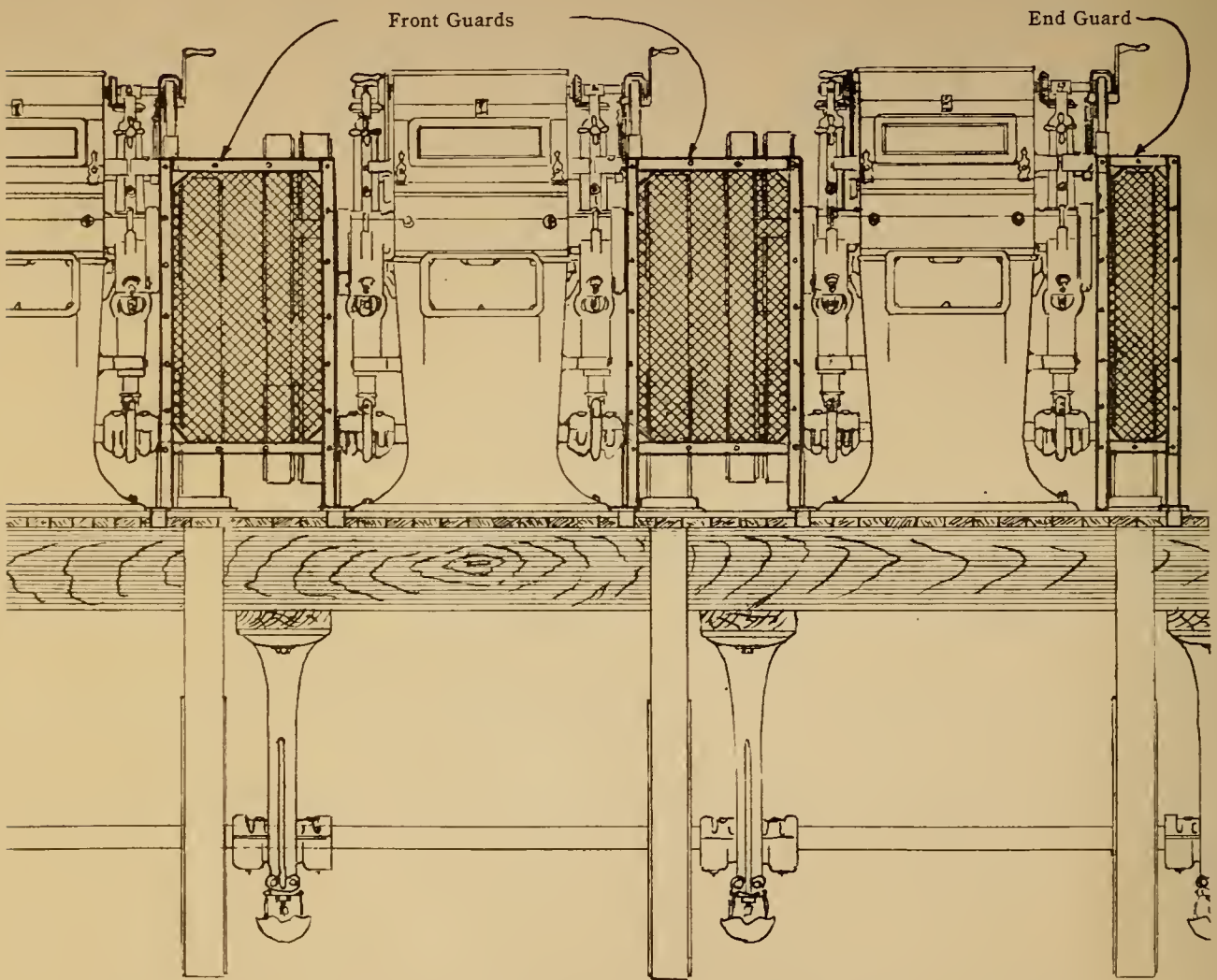
CONCRETE FLOORS

When necessary to set the guards on concrete floors, we recommend that the guard be completed before the holes are placed in the floor for the legs. When this is done, attach the legs to the frame and locate the desired position of the holes in the floor, after which they may be cut out to fit. Babbitt metal should then be poured in the hole in order that the tapered end of the legs have a rigid fit. The guard can be blocked up before pouring the babbitt in order to secure a proper setting.

By attaching the guard to the floor in either of the above described methods, any of the protected parts of the machine are instantly available when necessary to make repairs or adjustments of any nature. The guard is simply lifted out of the holes and set aside temporarily. After the work is completed, it is readily replaced without loosening bolts or requiring tools of any kind.

Specify on all inquiries or orders whether guards are to be set in wood or concrete floors.

Roller Mill Belt Guards



Front View of Roller Mills, Showing Front and End Guards. For End View of End Guards see Page 12

Front Guards

ON the opposite page the front guards are shown in place in front of the belts on a line of rolls. This illustration gives a general idea of the proper proportions as well as showing how the guards will appear.

They should be placed on both sides of the mills when a passageway is used, to protect employe from contact with the belts. The guards are attached to the floor with "Q-D" guard supports shown on page 8 which provide for instant removal of the guard in case of necessity.

Where mills of various sizes are grouped together the guards should be made the same height for all mills; this gives a uniform appearance and simplifies the construction. However, when the various sizes are in separate groups the heights can be made to fit each group.

These guards are regularly made in three standard heights as follows: 4 ft., 4 ft. 6 in., and 5 ft. (see dimension sheet on page 14), but other sizes can be furnished if desired.

The materials for front guards can be furnished cut to size, complete ready to be assembled; or the guards can be made up ready for installation at about 40 per cent additional cost. On all orders or inquiries specify whether material only or complete guards are wanted.

Measurements Required

On page 14 is a dimension sheet showing the measurements required for Front Guards. By referring to the letter symbols in connection with the instructions below the subject will be self-explanatory.

DIMENSION "A"

Measure the distance from the outside end of the bearing on one mill to the outside end of the bearing on the adjoining mill. This distance should be measured between every mill where the front guards are to be used, as it will vary with the different size mills and also depending on how far apart the mills are set.

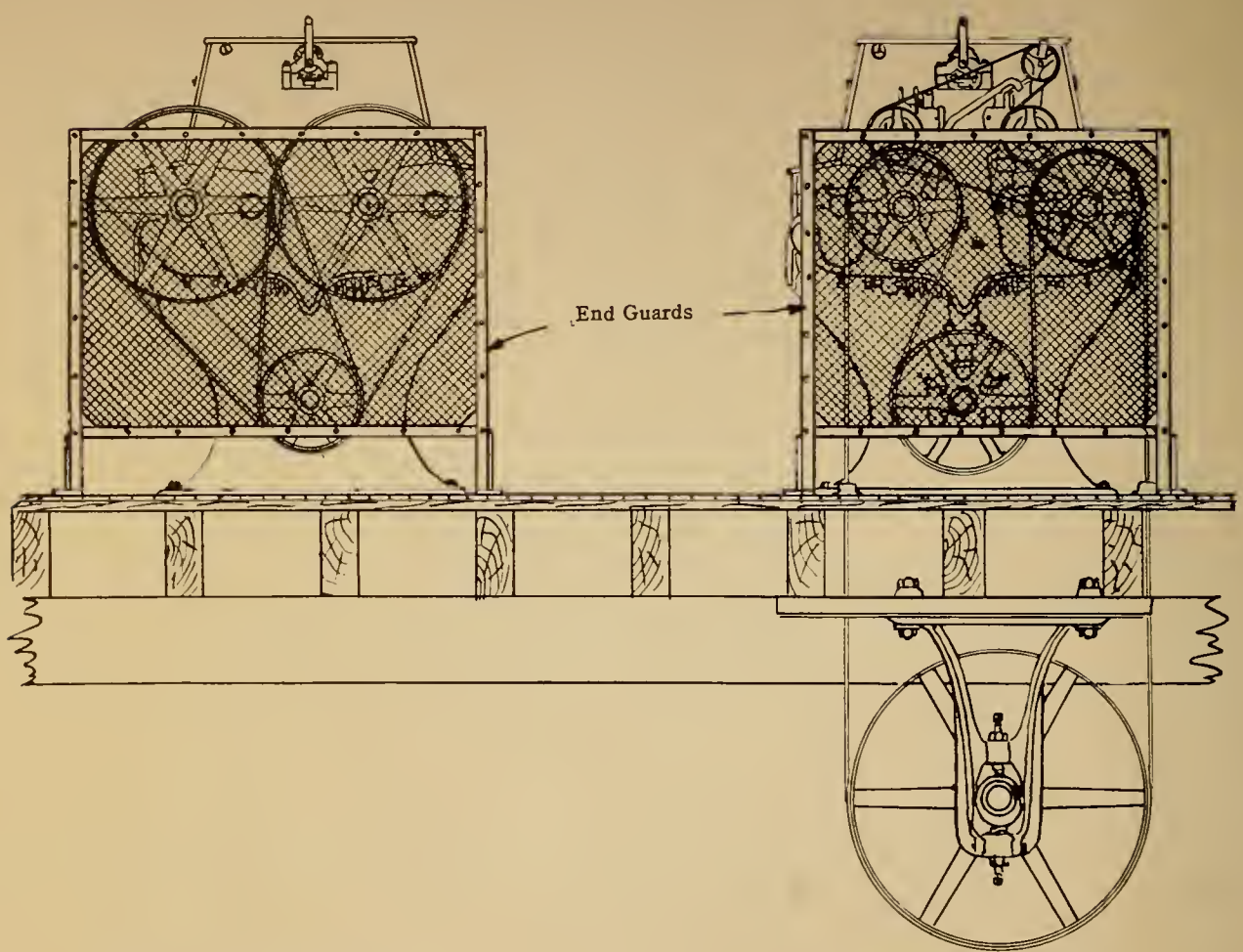
DIMENSION "B"

Measure the height from the floor to the top of the largest pulley on either of the mills for which the guard is intended. This height should be measured on every mill in order that any variation in size of pulleys or heights of shafts may be known.

When requesting information on front guards the following form will furnish all the of necessary information.

4 front guards—A, 23 in.; B, 43 in.
17 front guards—A, 29 in.; B, 43 in.
2 front guards—A, 29 in.; B, 36 in.

Roller Mill Belt Guards



End Guard on Differential Side

End Guard on Driving Side

See Page 10 for Front View of Front and End Guards

End Guards

ON the opposite page the end guards are shown in place at the end of a line of Rolls. This illustration gives a general idea of the proper proportions as well as showing how the guards will appear. On page 10 is shown a side view of the end guard.

These guards should be placed at the ends of the rolls and on both sides of passageways between the rolls. They are attached to the floor with "Q-D" guard supports shown on page 8 which provide for instant removal of the guard in case of necessity.

The end guards on the differential side of the mills will be higher than those on the driving side, but in order to simplify construction it is advisable to split the difference and make them both the same size. This gives a more uniform appearance and also simplifies the construction.

These guards are regularly made in three standard heights as follows: 4 ft., 4 ft. 6 in., and 5 ft. (see dimension sheet on page 14), but other sizes can be furnished if desired.

The materials for end guards can be furnished cut to size, complete ready for assembling; or the guards can be made up ready for installation at about 40 per cent additional cost. On all orders or inquiries specify whether material only or complete guards are wanted.

Measurements Required

On page 14 is a dimension sheet showing the measurements required for end guards. By referring to the letter symbols in connection with the instructions below the subject will be self-explanatory.

DIMENSION "C"

Measure from the outside end of the bearing on the driving side to the outside rim of the pulley.

DIMENSION "D"

Measure the distance between the outside faces of the two driving pulleys.

DIMENSION "E"

Measure the height from the floor to the top face of the driving pulley.

DIMENSION "F"

Measure from the outside end of the bearing on the differential side to the outside rim of the pulley farthest away from the mill.

DIMENSION "G"

Measure the distance between the outside faces of the two differential pulleys.

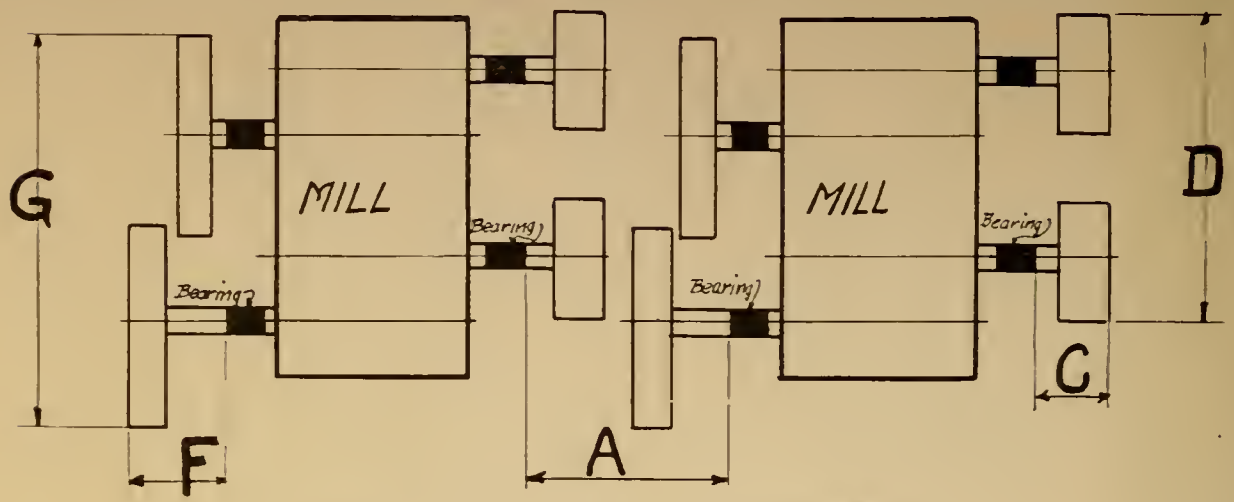
DIMENSION "H"

Measure the height from the floor to the top face of the differential pulleys.

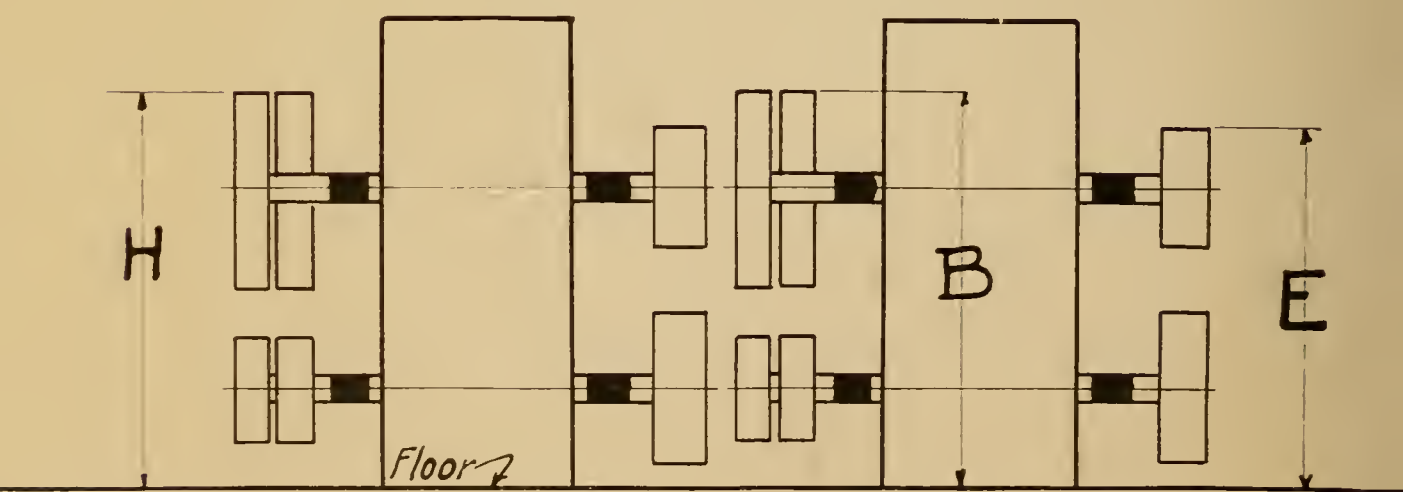
When requesting information on end guards the following form will furnish all the necessary information.

2 end guards—C, 13 in.; D, 48 in., E, 49 in.
5 end guards—C, 13 in.; D, 42 in., E, 46 in.
3 end guards—F, 15 in.; G, 49 in., H, 49 in.
7 end guards—F, 18 in.; G, 49 in., H, 52 in.

Dimension Sheet for Roller Mill Belt Guards



Floor Plan of Adjoining Roller Mills



Front Elevation of Adjoining Roller Mills

Dimensions "A" and "B" are for Front Guards Only. Dimensions "C-D-E" are for End Guards on Driving Side of Mill. Dimensions "F-G-H" are for End Guards on Differential Side of Mill

Conclusion

WHILE the subject treated within these pages deals principally with Roller Mill Guards, the same type of guards can be used for other places about the mill that require guarding.

While there are standard sizes for Roller Mill Guards, the materials will readily adapt themselves to any size. We will be pleased to quote the net cost on any size guard upon receipt of specifications.

Cost of Materials

By handling the guard materials on a quantity basis and having our own machinery for manufacturing, we can save our members from 50 to 60 per cent in the cost of the guards as compared with the prices charged by others. This is a part of our policy of "Service to Members" and is concrete evidence that we are meeting this obligation. The guards and materials are supplied at net cost, and to our members it is virtually gratis, for the credits on the insurance rate more than offset the initial cost in a short time.

Millers Mutual Casualty Insurance Co.

Chicago

R. R. DONNELLEY & SONS CO., PRINTERS, CHICAGO

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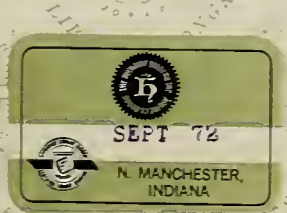

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